

1 I CLAIM:

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3 1. The method of providing an LED array
4 assembly, that includes:

5 a) providing a grid of electrical
6 conductors,

7 b) providing light emitting diodes and
8 locating the diodes in association with the grid and in
9 electrical communication with the conductors that
10 provide power for LED operation,

11 c) the grid operable to receive heat from
12 the diodes during diode operation, and the grid
13 configured for passing coolant fluid for transfer of
14 heat to the fluid.

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17 2. The method of claim 1 wherein the
18 electrical conductors are provided in the form of
19 insulated metal wires that act as electrical and
20 thermal conductors and that also serve as structural
21 load conductors, for arrays of such diodes.

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24 3. The method of claim 1 wherein the wires
25 are dielectrically coated.

1 4. The method of claim 1 wherein the
2 conductors are provided in the form of woven wires.

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5 5. The method of claim 1 wherein the array
6 has at least one of the following characteristics:

- 7 i) curvature
8 ii) complex shape
9 iii) compliant configuration
10 iv) flexibility.

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13 6. The method of claim 1 including
14 effecting and/or guiding flow of coolant fluid through
15 or along the array.

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18 7. The method of claim 1 wherein the grid
19 is provided as a dark grid to increase viewing contrast
20 with LEDs during their operation.

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1 8. The method of claim 1 including
2 providing one of the following:

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9. The method of claim 1 including

12 providing a first sheet faci
13 light emitted by the diodes.

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16 10. The method of claim 9 including

17 providing a second sheet at an opposite side of the
18 diodes, the first and second sheets forming an
19 enclosure within which coolant fluid is flowable.

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22 11. The method of claim 1 wherein the grid
23 of electrical conductors is provided to include primary
24 conductors extending generally in one direction, and
25 secondary conductors extending generally in another
26 direction, the LEDs being mounted on the primary

1 conductors, and having terminals extending to the
2 secondary conductors for electrical association
3 thereto.

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6 12. The method of claim 11 wherein the
7 secondary conductors are configured to extend above
8 and/or below the primary conductors.

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11 13. The method of claim 12 wherein the
12 secondary conductors are provided to have one of the
13 following:

- 14 i) substantial spacing therebetween to
15 pass coolant fluid through the
16 grid,
- 17 ii) lack of substantial spacing
18 therebetween, to pass coolant fluid
19 parallel to the grid,
- 20 iii) cross sections which are
21 substantially less than the cross
22 sections of primary conductors
23 which support diodes,
- 24 iv) junctions with diode wires.

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1 14. The method of claim 1 wherein certain of
2 the conductors include multiple wire strands.

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5 15. The method of claim 1 including
6 providing balls or beads and seating the balls or beads
7 on the conductors to act as spacers.

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10 16. The method of claim 1 including
11 providing means displacing and conducting coolant to
12 one side of the screen, to flow through or adjacent to
13 the array assembly.

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16 17. The method of claim 1 including
17 providing a transparent panel extending in the path of
18 light from the LEDs.

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21 18. The method of claim 1 wherein each diode
22 is provided to include a light emitter or emitters, a
23 transparent container having a window area, the emitter
24 supported within the container, and a reflector within
25 the container to reflect emitted light toward said
26 window.

1 19. The method of claim 18 including
2 providing an electrical lead or leads extending with
3 helical configuration within the container to said
4 emitter or emitters.

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7 20. The method of claim 19 wherein the lead
8 or leads is or are formed to has or have a generally
9 rectangular cross section, for stable support of the
10 emitter or emitters.

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13 21. The method of claim 18 including
14 providing a metallic base carrying the container, and
15 through which said lead or leads extend.

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18 22. The method of claim 20 including
19 providing said lead or leads include wires associated
20 with a red and/or green and/or blue emitter.

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23 23. The method of claim 18 wherein multiple
24 of said diodes have their container windows facing in
25 the same or selected directions.

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1 24. The method of claim 23 wherein the
2 diodes and array assembly define a display.

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5 25. The method of claim 21 wherein said base
6 is provided to have an edge portion defining a recess
7 for reception of a support for the diode, allowing
8 diode rotation about the support, and including
9 effecting said rotation.

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12 26. The method of claim 25 wherein said
13 electrical conductors are provided to define a mesh,
14 and multiple of said LED devices are carried by the
15 mesh, with said recesses receiving portions of said
16 conductors allowing rotation of the devices relative to
17 the mesh.

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20 27. The method of providing a light emitting
21 diode device, that includes

22 i) providing an electrically
23 energizable light emitter, or
24 emitters;

25 ii) providing a transparent container
26 having a window;

- iii) supporting the emitter or emitters within the container;
- iv) and providing a reflector structure within the container to reflect emitted light toward said window.

8 28. The method of claim 27 including
9 providing an electrical lead or leads extending with
10 helical configuration within the container to said
11 emitter or emitters.

14 29. The method of claim 27 wherein the lead
15 or leads is or are provided to has or have a generally
16 rectangular cross section, and to support the emitter
17 or emitters.

20 30. The method of claim 27 including
21 providing a metallic base carrying the container, and
22 through which said lead or leads extend.

1 31. The method of claim 27 wherein said
2 reflector structure is provided to include spaced
3 reflecting walls, and a curved reflector supported
4 between said walls.

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7 32. The method of claim 28 including
8 providing said lead or leads to include wires
9 associated with a red and/or green and/or blue emitter.

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12 33. The method of claim 27 including
13 providing multiple of said devices having their windows
14 facing in a display direction or directions.

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17 34. The method of claim 33 including
18 providing display structure supporting said diode
19 devices in a multiple diode display configuration.

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22 35. The method of claim 30 wherein said base
23 has is provided to have an edge portion defining a
24 recess for reception of a support for the diode,
25 allowing diode rotation about the support, and

1 including effecting said rotation to a selected diode
2 display configuration.

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5 36. The method of claim 1 wherein certain of
6 said conductors that provide power for diode operation
7 are configured as first, second and third pairs of
8 wires to transmit electrical energization to red, green
9 and blue LED pixels, respectively.

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12 37. The method of claim 36 wherein each LED
13 has primary, secondary and tertiary wires electrically
14 connected to the red, green and blue pixels,
15 respectively, said primary wire configured to be clamp
16 connected to said first pair of wires, said secondary
17 wire configured to be clamp connected to said second
18 pair of wires, and said tertiary wire configured to be
19 clamp connected to said third pair of wires.

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22 38. The method of claim 37 including
23 locating said three pairs of wires about a central
24 region, and said LED primary, secondary and tertiary
25 wires are respectively nested between said three pairs
26 of wires, there being a retainer acting to clamp said

1 primary, secondary and tertiary wires in nested
2 position.

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5 39. The method of claim 38 wherein said
6 certain conductors are located to extend at an acute
7 angle or angles relative to others of said conductors,
8 said certain conductors defining LED addressing
9 conductors to selectively address LEDs on said others
10 of the conductors.

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13 40. The method of claim 39 wherein said
14 acute angle or angles are approximately 45°.

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17 41. The method of claim 1 including
18 providing protective means at one of the following:

19 i) at the front of the grid;

20 ii) at the rear of the grid;

21 iii) at both the front and rear of the
22 grid.

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1 42. The method of claim 1 wherein said
2 protective means is provided to include at least one
3 metallic plate.

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6 43. The method of claim 42 wherein said
7 metallic plate is characterized by one of the
8 following:

9 x₁) forming air passing openings;

10 x₂) forming air passing louvers;

11 x₃) forming air passing through slits.

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14 44. The method of claim 42 wherein said

15 protective means is provided in the form of a metallic
16 screen or screens.

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19 45. The method of claim 1 wherein the diodes
20 are removably supported by the grid.

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23 46. The method of claim 1 characterized by
24 at least one of the following:

1 ii) diode emission control electronics
2 provided at or proximate an edge or
3 edges of the grid.

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6 47. The method of claim 1 including
7 providing a light reflecting mirror or mirrors in
8 association with a diode or diodes.

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11 48. The method of claim 47 wherein said
12 mirror or mirrors is or are provided in the form of one
13 or more of the following:

14 i) a parabolic mirror
15 ii) dual mirrors within a package
16 iii) a parabolic trough forming mirror
17 or mirrors.

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20 49. The method of claim 1 including
21 providing a conduit for extensions of the conductors,
22 outside the grid.

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1 50. The method of claim 49 including
2 providing spring tension exerting means acting on the
3 conduit.

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6 51. The method of claim 49 including
7 providing holders about which end portions of the
8 conductors in the grid are looped, the holders provided
9 in association with the conduit.

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12 52. The method of claim 1 wherein the diodes
13 are provided in the form of packages having adjustable
14 operative connection to the conductors characterized by
15 one of the following:

- 16 i) rotatable adjustability about one
- 17 axis
- 18 ii) rotatable adjustability about two
- 19 axes.

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22 53. The method of claim 52 wherein the
23 diodes packages in the array are provided to have
24 different positions of adjusted angularity.

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1 54. The method of providing an LED array
2 assembly that includes:

- 3 a) providing a grid of electrical
- 4 conductors,

5 b) providing light emitting diodes and
6 locating the diodes in association with the grid and in
7 electrical communication with the conductors that
8 provide power for LED operation,

9 c) and providing LED structure allowing
10 rotary adjustment of at least some LEDs relative to
11 conductors on which those LEDs are supported.

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14 55. The method of claim 54 wherein said
15 rotary adjustment is characterized by one of the
16 following:

- 17 i) rotation about an axis or axes
- 18 defined by the LED or LEDs
- 19 ii) rotation about a conductor axis or
- 20 axes
- 21 iii) rotation about both i) and ii)
- 22 above.

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1 56. The method of claim 54 including
2 providing clip means positioning the conductors
3 relative to which the LEDs are rotatably adjustable.

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7 57. The method that includes:

- 8 a) providing multiple LEDs in a display
9 array, and
10 b) selectively electrically energizing the
11 LEDs in the array to adjust the display,
12 c) cooling the display array.

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15 58. The of claim 57 including selectively
16 adjusting the positioning of the LEDs in the array.

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